Table of Contents

ABSTARCT

It is imperious to know the reproductive parameters of the subsisting swine breed for profitable farming in Bangladesh. This study was designed to compare the reproductive parameters of sows at hilly areas between the local and crossbred at farm and backyard level. A total of 116 breedable sows were included. The data on age at puberty, litter size, birth weight, weaning weight, gestation length, interval between farrowing and number of piglets born per sow in local and crossbred sows were determined and direct questionnaire method was used for data collection. The present study revealed that age at puberty between farm and backyard system of crossbred sows was 8.88±0.153 and 9.85±0.221 months, respectively. The farrowing interval was shorter in crossbred sows which were kept in farming system rather than backyard system. The interval between farrowing and onset of estrus was shorter in crossbred sows. The gestation length was almost similar between backyard and farm condition. The number of litter size per sow per farrowing was 8.45±0.41 in crossbred and 7.17±0.250 in local pigs at backyard system. The birth weight and weaning weight were more in farm conditions than backyard system. The age at puberty in local breed was lower than the crossbred and litter size was 8.45±0.407 in crossbred which was higher than local breed 7.17±0.250 in backyard system. These results suggest that reproductive parameters of local sow need to be improved for better production and crossbred sows should be reared for obtaining desired productivity.

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CHAPTER-I

INTRODUCTION

Bangladesh is agricultural country, where livestock is the main fuel for the driving of economy of Bangladesh. Livestock is one of its important components which provide protein, solve unemployment and earn foreign exchange (Taylor and Roese 2006; Cole 1996). Bangladesh is one of the densely populated places in this world. Almost all of the outlying men and women in the land are generally landless and they are also living below poverty line.

The pigs are reared by poor people who neither have means nor know how to improve production. A lot of individuals tend to be out of work as well as regarding 50% from the individuals are afflicted by malnutrition. Pigs tend to be quick developing as well as probably the most productive animal's breeds (Durranc, 2008; Phookan *et al.,* 2006; Prakash *et al.,* 2009; Taylor and Roese, 2006). Pig is considered as the richest source of animal protein at a lower cost for the peoples who consume pork. In Bangladesh, domestic breeds of pig are reared on garbage, kitchen waste and human excreta. Productivity of domestic breeds is low.

Large pigs have been noticed in Chittagong hill Tract. In fact, it is really hard task to find out the specific variety of pigs in Bangladesh due to most of them are indigenous breed. Most of the pigs are reared by the tribe people in mountain area. Due to the high number of litter size, easy rearing with available natural resources, high disease resistance and low production cost, pig rearing is getting importance in the tribal regions to extrude poverty. The pig rearing continues to be primitive scavenging in nature because the farmers remain backward in education, economy and social activities. However, it is imperative to know the reproductive parameters of the existing swine breed in Bangladesh.

Therefore, government has an initiative to improve the native pigs by crossbreeding them with superior exotic genes. For that reason exotic breeds specially Yorkshire, Landrace, Hampshire and Poland China are gaining popularity

due to high growth potential (Johnson *et al., 2001*). For this vision it is imperative that indigenous pig resources might be up-graded to meet the requirement of animal protein (Taneja *et al.,* 1978). More than 1 billion pigs in the world, about 65% are raised in Asiatic countries (FAO, 2011).

Improvement of reproductive traits will improve efficiency of swine growth for the reproductive system behavior could make improvements to efficacy for swine production. However exotic germ plasm, when introduced into hot and humid climate like as Bangladesh, India etc, suffers higher embryonic death losses resulting decreasing the number of litter size. Estimated genetic correlations among productive and reproductive traits are low and sometimes positive or negative (Rydhmer *et al*., 1995; Adamec and Johnson, 1997).

Pig has high reproductive performance with excellent prolific nature and fertilization capacity (Peltoniemi *et al*., 2007). A recent report on production system of swine in the rural area of Rangamati and Khagrachari districts of Bangladesh demonstrated that the average litter size, birth weight, post-weaning weight and weaning period were 9.3, 1.72 kg, 9.0 kg and 40.8 days, respectively (Hossain *et al*., 2011). This low reproductive performance of sow in Bangladesh is due to inefficient management of rearing system. A number of studies have documented that litter size (number born) in primiparous sows is larger than that in gilts and that litter size increases through the fourth or fifth pregnancy (Carmichael and Rice, 1920; Lynch, 1965). For this reason, it is indispensable to know the reproductive parameters of the existing swine breed in Bangladesh.

The objectives of this study are:
- To estimate reproductive performance of crossbred sows under backyard and farming system.
- To know the reproductive performance of local and crossbred sows under backyard system.
- To know the effect of parity on reproductive performance of sows under farming condition.

CHAPTER-II

MATERIALS AND METHOD

The study was conducted in Sadar upazilla of Rangamati district. The reproductive traits of 116 sows were recorded from district pig farm, Manikchari, Rangamati sadar (66) and from 11 backyard pig farm of Rangamati sadar upazila (50).

1. Methods of data collection

In order to make the data collection programme successful, the investigator personally visited door to door to the selected upazila of the study area and from the authorized person of the district pig farm. Direct interview method was used for collection of information. Information given by owners of sows was recorded on questionnaire for analysis.

2. Preparation of the questionnaire

The questionnaire was prepared according to the objectives of the investigation and was designed in a simple way so that the farmers could understand easily. The questionnaire included questions to collect information on age at puberty, gestation period, number of piglets born per sow, parity of sows, and interval between farrowing, litter size, birth weight and weaning weight.

3. Determination of reproductive parameters of sows

I) Age at puberty

It was determined by calculating intervals from birth to first detected estrus of individual gilt and was expressed in month.

II) Type of breed

It was determined by breed history and its cross from the owner of pig

III) Weaning weight

It was determined by calculating body weight after weaning by weighing balance and according to owner observation.

IV) Birth weight

It was determined by calculating body weight after born by weighing balance in farm and according to owner opinion at rural level.

V) Gestation length of sows

It was determined by calculating the interval between the date of natural service and the date of parturition. The gestation period was expressed in days.

VI) Number of piglets born per sow

It was determined by counting the numbers of live and dead fetuses delivered by individual sows.

VII) Parity of sows

It was determined by recording the number of parturition occurred by individual sows. Farmers were interviewed to know this.

VIII) Interval between farrowing

It was determined by calculating by the interval between date of parturition and date of onset of estrus and was expressed in days.

4. Statistical analysis

The collected data (age at puberty, farrowing interval, gestation period etc) were entered to MS excel (Microsoft office 2007, USA) and analyzed by One-way ANOVA of compare means procedure using SPSS software version 16. Descriptive statistics were used to determine the mean and standard error of mean.

CHAPTER-III

RESULT

The study was conducted to observe reproductive performances of both local and crossbred sows of rural areas in Rangamati hill district. The present study determined the reproductive parameters namely age at puberty, interval between farrowing, gestation length, and number of parity, litter size, birth weight and weaning weight, which are presented in Table 3.1.

Table 3.1: Reproductive performance of crossbred sows under backyard and farming system

Reproductive traits	Farming	Backyard	F -value	Significance value
	Mean± SE	Mean± SE		
Age at puberty	8.88±0.15	9.85±0.22	10.40	**
Litter size	8.48±0.25	8.45±0.41	0.00	NS
Birth weight	0.74±0.02	0.65±0.02	8.12	**
Weaning weight	4.83±0.05	4.79±0.09	0.15	NS
Gestation period	116.83±0.37	115.45±0.56	1.61	NS
Farrowing interval	7.19±0.09	7.60±0.10	4.21	*

* *Mean significance at 5% level (P<0.05)

The outcome of this above table between farming and backyard system indicate that the age at puberty and birth weight is highly significant (P<0.05) and farrowing interval is also significant (P<0.05). In this calculation the mean and standard errors of age at puberty, birth weight and farrowing interval are (8.88±0.15 month, 0.74±0.02 kg and 7.19±0.09 month in farming system respectively and 9.85±0.221 month, 0.65±0.02 kg and 7.60±0.10 month in backyard system respectively. The litter size, weaning weight, gestation period are not significant (P>0.05).

Table 3.2: Comparison of reproductive performances between crossbred and local sows under backyard system

Reproductive traits	Cross Mean ± SE	Local Mean ± SE	F -value	Significance value
Age at puberty	9.85 ±0.22	9.37±0.32	1.25	NS
Litter size	8.45±0.41	7.17±0.25	8.10	**
Birth weight	0.65±0.02	0.72±.02	3.95	NS
Weaning weight	4.79±0.09	4.86±0.11	0.23	NS
Gestation period	115.45±0.56	115.37±0.68	0.01	NS
Farrowing interval	7.60±0.10	7.49±0.17	0.20	NS

* *Mean significance at 5% level (P<0.05)

In the Table 3.2 we find that the litter size is highly significant (P<0.05) between cross and local breed within backyard system and mean and standard error between cross and local breed are 8.45±0.41, 7.17±0.25 comparatively. On the other hand age at puberty, birth weight, weaning weight, gestation period, farrowing interval are significant.

Table 3.3: Effect of parity on reproductive performance of sows under farming condition

Reproductive traits	Parity number								F- value	Significance
	1	2	3	4	5	6	7	8		
	Me± SE	Me± SE	Me ± SE	Me ± SE	Me ± SE	Me ± SE	Me ± SE	Me ± SE		
Age at puberty	9.16±0.18	9.33±0.24	8.83±0.7	8.58±0.19	9.17±0.30	8.67±0.33	9.50±0.50	9.00±1.00	1.15	NS
Litter size	7.47±0.37	9.22±0.40	8.50±0.43	8.08±0.69	8.17±1.07	11.00±1.16	8.25±0.85	10.50±1.50	2.26	*
Birth weight	0.78±0.03	0.68±0.03	0.77±0.07	0.70±0.03	0.82±0.04	0.70±0.10	0.78±0.08	0.70±0.10	1.08	NS
Weaning weight	4.96±.063	4.73±.11	4.98±.06	4.80±.15	4.87±.09	4.63±.20	4.67±.24	4.75±.25	.99	NS
Gestation period	116.68±.54	116.89±1.20	117.67±1.41	115.92±.96	115.33±.989	115.00±1.15	116.00±1.23	115.00±3.00	.83	NS
Farrowing interval	6.84±.14	7.44±.29	7.25±.44	7.21±.23	8.00±.00	7.00±.58	7.25±.25	7.000±.00	1.81	NS

* *Mean significance at 5% level (P<0.05)

Table 3.3 notifies that the comparison of reproductive traits among the parity number in farming conditions where litter size is highly significant (P<0.05). The age at puberty, birth weight, weaning weight, gestation period and farrowing interval are not significant with the parity number.

CHAPTER-IV

DISCUSSION

Age at puberty is one of the important reproductive parameters for any profitable farm animals. In this calculation the average age at puberty, 8.88±0.153 month, in farming system and 9.85±0.221 month, in backyard system respectively. Similarly, the age at puberty in European Large White gilts was 8 months (Bon *et al.,* 1979). However, the age at puberty of present study is higher than the previous study (Sinha, 2012; Tummaruk *et al.,* 2003). Occurrence of puberty between 5 and 8 months of age has been reported in European breeds (Christenson and Ford, 1979; Hughes, 1982) which also coincide with my study. The average births weight of pig 1.72 kg in rural area (Hossain *et al.,* 2012) which is higher than my observation that 0.74±0.016 kg birth weight in farm and 0.65±0.02 kg in backyard system. It is observed that the mean interval of farrowing between farm and backyard crossbred sows are 7.19±0.09 month and 7.60±0.10 month. This result is consistent with the finding of Sinha (2012). The reported mean of farrowing interval in cross breed shows is higher than that of a previous study (Knox and Zas, 2001) where the mean of farrowing interval is 86.2 days. The variations of farrowing interval of different studies might be due to variations in breeds of pigs and their crossing, agro-climatic conditions, feeding and management practices.

The mean number of litter size was 8.45 which is higher than the previous study (Motaleb *et al*., 2014) where 5.3 piglets is born per litter and lower than the previous finding (Halina *et al*., 1993) obtained 12.2 piglets per litter after evaluating 98 farrowings. (Cole and Foxcroft 1982) also reported to have 12 piglets per litter in domestic sows which also higher than my study. The variation among studies may be due to lower body weight and smaller size of the sows.

A relationship between litter size and parity in which litter size continued to increase through the fifth parity or approximately 3 years of age (Carmichael and Rice, 1920; Lynch, 1965) which not coincide with my study where as the fluctuations are found in the production of piglets. The parity have no effects on   the weaning weight, birth weight, age at puberty, gestation period (Akdag *et al*., 2009) which is coincide with my observations. There was no significant effect of parity on those traits.

CHAPTER-V

CONCLUSION

It might be concluded that the age at puberty of crossbred sows between farming and backyard system were 8.88±0.15 month and 9.85±0.22 month, respectively. The litter size was 8.48±0.25 which was longer in farming sows within the crossbred than backyard system. The interval between farrowing was shorter in crossbred sows which were kept in farming system than backyard system. The values of gestation length were almost similar. The birth weight and weaning weight were more in farm conditions than backyard system. The age at puberty in local was lower than the crossbred and litter size was 8.45±0.41 in crossbred which was higher than local breed 7.17±0.25 in backyard system. Litter size was increased with the parity number and it was fluctuated due to the parity number. The production system of pig farm and its reproductive performance was not so satisfactory in our country. The crossbred sows should be reared for obtaining desired productivity.

LIMITATION

The study was conducted on small population size, short time duration, and small study area. The farmer does not maintain proper record keeping system. It was very hard to survey in hill tract area. So the result of the study might not represent the real feature.

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BIOGRAPHY

Md. Iqbal Hossain; son of **Md. Abdul Bari** and **Jahanara Begum** has passed the Secondary School Certificate with GPA-5, from RammohanTamizia High School and Higher Secondary School Certificate from Comilla Government Victoria College with GPA 4.70 from Comilla Board. Now he is a interns' student of Veterinary medicine, Chittagong Veterinary and Animal Sciences University. His favorite hobby is reading books and he want to be an honest person and researcher .He feels interest for find out new techniques for the development of animal world.

ANNEX

A QUESTIONNAIRE ON REPRODUCTIVE TRAITS OF SWINE IN FARMING AND RURAL CONDITION IN RANGAMTI DISTRICT, BANGLADESH

SL NO: …………….

Date: …………..

Farming type: …………………

Owner's name: ………   Address: …………..

Population no: ………….

Breed: …….   Age: ……   Sex: ……..   Body weight: …….

Species Color: ……….

Reproductive traits:

1. Age at first maturation ………………

2. No of parity: …………………

3. Litter size: ………………….

4. Birth weight: ………………….

5. Weaning weight: ………………..

6. Gestation period: ……………….

7. Farrowing interval: ……….

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Signature of interviewer